

AMENDMENT TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

Listing of Claims:

Claim 1 (Currently amended): A frequency synchronizer system, comprising:

~~a processor for executing a sequence of operations, where said operations include:~~

- ~~a) initializing an estimated frequency correction factor;~~
- b) means for determining a corrected frequency offset value from a first product of a sample signal and ~~said~~ an estimated frequency correction factor;
- c) means for filtering a first sample of said corrected frequency offset value to obtain a filtered corrected frequency offset value;
- d) means for imparting a delay to a second sample of said corrected frequency offset value to obtain a delayed corrected frequency offset value;
- e) means for ~~determining~~ transforming into a conjugate product value ~~from a second product of said filtered corrected frequency offset value and a conjugate of said filtered corrected frequency offset value;~~
- f) means for determining a delay conjugate value from a third product of said delayed corrected frequency offset value and said conjugate product value;
- g) means for determining an error signal from said delay conjugate value;
- h) means for determining a frequency offset value from said error signal; and
- i) means for determining an updated value of said estimated frequency correction factor from said frequency offset value.

Claim 2 (Canceled)

Claim 3 (Currently amended): The frequency synchronizer system of claim 1 further ~~including~~ comprising a digital receiver for providing an estimate of data encoded in a continuous-phase modulation signal in response to receiving said corrected frequency offset value.

Claim 4 (Currently amended): The frequency synchronizer system of claim 1 further ~~including~~ comprising an anti-aliasing filter for transforming said continuous-phase modulation signal into a filtered signal.

Claim 5 (Currently amended): The frequency synchronizer system of claim 4 further ~~including~~ comprising a sampler for transforming said filtered signal into a sequence of discrete time based samples.

Claim 6 (New): A frequency synchronizer system, comprising:

a sample signal, $x(kT_s)$, where k is the sample index and T_s defines the sampling interval in seconds;

means for determining a corrected frequency offset value, $y(kT_s)$, from a first product of said sample signal and an estimated frequency correction factor, wherein said estimated frequency correction factor is a discrete time sequence defined by $e^{-j2\pi k\hat{V}T_s}$ and where \hat{V} is an estimate of unknown frequency offset V ;

means for filtering a first sample of said corrected frequency offset value, $y(kT_s)$, to obtain a filtered corrected frequency offset value, $w(kT_s)$;

means for imparting a delay D to a second sample of said corrected frequency offset value, $y(kT_s)$, to obtain a delayed corrected frequency offset value, $y[(k-D)T_s]$;

means for transforming into a conjugate product value, $w^*(kT_s) w(kT_s)$ said filtered corrected frequency offset value, $w(kT_s)$;

means for determining a delay conjugate value from a third product of said delayed corrected frequency offset value, $y[(k-D)T_s]$, and said conjugate product value, $w^*(kT_s) w(kT_s)$;

means for determining an error signal, $e(nT)$, where n is a positive integer index allowing for the generation of updated error signals at intervals of T seconds, from said delay conjugate value, $y[(k-D)T_s]$;

means for determining a frequency offset value, $\hat{v}(nT)$, from said error signal, $e(nT)$; and

means for determining an updated value of said estimated frequency correction factor from said frequency offset value, $\hat{v}(nT)$;

Claim 7 (New): The frequency synchronizer system of claim 6 further comprising a digital receiver for providing an estimate of data encoded in a continuous-phase modulation signal in response to receiving said corrected frequency offset value.

Claim 8 (New): The frequency synchronizer system of claim 6 further comprising an anti-aliasing filter for transforming said continuous-phase modulation signal into a filtered signal.

Claim 9 (New): The frequency synchronizer system of claim 8 further comprising a sampler for transforming said filtered signal into a sequence of discrete time based samples.

Claim 10 (New): A method for frequency synchronization, comprising the steps of:

(a) initializing an estimated frequency correction factor;

- (b) determining a corrected frequency offset value from a first product of a sample signal and said estimated frequency correction factor;
- (c) filtering a first sample of said corrected frequency offset value to obtain a filtered corrected frequency offset value;
- (d) imparting a delay to a second sample of said corrected frequency offset value to obtain a delayed corrected frequency offset value;
- (e) determining a conjugate product value from a second product of said filtered corrected frequency offset value and a conjugate of said filtered corrected frequency offset value;
- (f) determining a delay conjugate value from a third product of said delayed corrected frequency offset value and said conjugate product value;
- (g) determining an error signal from said delay conjugate value;
- (h) determining a frequency offset value from said error signal; and
- (i) determining an updated value of said estimated frequency correction factor from said frequency offset value.

Claim 11 (New): The method of claim 1 wherein said steps (b) through (i) are repeated an integral number of times.

Claim 12 (New): The method of claim 1 further including the step of providing an estimate of data encoded in a continuous-phase modulation signal in response to receiving said corrected frequency offset value.

Claim 13 (New): The method of claim 1 further including the step of transforming said continuous-phase modulation signal into a filtered signal.

Claim 14 (New): The method of claim 9 further including the step of transforming said filtered signal into a sequence of discrete time based samples.

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